

TECHNOLOGY DEPARTMENT

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JUN 9 1948

SCIENCE NEWS LETTER

Vol. 53, No. 23

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JUNE 5, 1948



Mineral Paper

See Page 358

A SCIENCE SERVICE PUBLICATION



Millions of Americans—with RCA television—will see history as it is made at the two National Political Conventions.

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This year, television joins press and radio as a "political reporter," in Philadelphia, at the Republican Convention, June 21, and the Democratic Convention, July 12. As political leaders step up to speak, you're right with them on the convention platform.

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RADIO CORPORATION of AMERICA

ELECTRONICS

Music Coded By Pulses

This new form of radio transmission is called pulse modulation and resembles telegraphy. It eliminates noise arising in transmission and gives good sound reproduction.

► MUSIC and voices can now be sent over the radio waves by a method which closely resembles telegraphy.

Pulse modulation, the new form of radio transmission, is being developed in the electronics laboratories at Massachusetts Institute of Technology by B. D. Smith, working under the supervision of Prof. William H. Radford. Similar studies are also being conducted in other parts of the country, notably in the Bell Telephone Laboratories.

Sounds to be "sent over the air" are coded, each sound wave amplitude being represented by some number on the binary scale, which is a number system using two as a base. An example of this system is the way shop mechanics measure distances in inches, half inches, quarter inches, and so on.

The name pulse modulation comes from the fact that the coding into binary numbers is done by pulses of electricity shown on a cathode-ray oscilloscope. There are five consecutive pulses of electricity in the model now being tested at M. I. T. In numbers on the binary scale this means that there are actually 32 separate numbers which can be represented; this gives 32 separate amplitude levels.

A beam of light may cross the oscilloscope screen at any one of 32 levels which are determined by the input voltage. A coding plate is put in front of the screen. This plate, which looks like a black card with transparent lines of varying lengths on it, transforms the picture on the oscilloscope into a series of flashes of light. These flashes are taken up by photoelectric cells and sent over the air as radio impulses. The whole picture on the oscilloscope is scanned once every ten-thousandth of a second.

These impulses reach the receiving apparatus, where they are converted into voltages. The amount of the voltage depends on what time during the ten-thousandth of a second the impulse arrives. In this manner the picture of the sound wave on the screen of the cathode ray oscilloscope is reconstructed in the receiving apparatus and the sound is reproduced through a loud speaker.

Since the sound is transmitted as a series of dashes the resemblance of this apparatus to telegraphy is marked. This pulse modulation system eliminates to great extent any noise which might arise in transmission and gives excellent sound reproduction. The final form of the apparatus is also expected to be quite inexpensive.

Science News Letter, June 5, 1948

TECHNOLOGY

Exposure Time of X-Rays Reduced by New Screen

► EXPOSURE time for taking an X-ray picture will be cut in half with use of a new high-speed X-ray intensifying screen now in production by the DuPont Company, Wilmington, Del.

Most important of the many advantages this offers is the decrease in time

necessary for the exposure. Since there is a limit to the amount of X-radiation that can be given, doctors are careful to expose a person as briefly as possible in taking pictures for diagnosis. This is particularly important if the patient is likely to need X-ray or radium treatment later. Difference between the new screen and present-day screens is in chemical composition. The new screen is made possible by use of a luminescent chemical new to the field, barium lead sulfate. This chemical is stable under both X-rays and light rays.

Calcium tungstate is the chemical which has previously been used as the principal component of intensifying screens for X-ray pictures. The new screen extends the distribution of fluorescence from 2800 angstrom units to 4600 angstrom units, with the maximum response at 3800. This is much further into the ultraviolet than the calcium tungstate screens extend.

The new screen should reduce the costs of X-ray pictures because it will increase the capacity of smaller X-ray outfits, such as portable ones, will save the tube life in the big machines and will take more pictures in the same time

Science News Letter, June 5, 1948



UNIQUE MEASURING DEVICE—A gauge for measuring the thickness of thin rubber and other thin films on continuous production equipment, has at its heart a radioactive isotope, byproduct of the nation's atomic energy plants. Shown in the picture is W. E. Morris, who developed it in the research laboratory of the Goodyear Tire and Rubber Company. It is capable of measuring material as thin as one-thousandth of an inch.

MEDICINE

Paralyzed Walk Again

Hemiplegia patients respond to physical medicine treatment utilizing massage, applications of heat, therapeutic baths and active exercises.

► AN INTENSIVE program of rehabilitation which enabled patients with partial paralysis to walk again is reported by Comdr. Edward W. Lowman (MC), U. S. N., Department of Physical Medicine, of the U. S. Naval Hospital in Philadelphia in the *Journal of the American Medical Association* (May 29).

Use of physical medicine, which proved so effective in these patients, includes massage in the first stages of treatment, application of heat and therapeutic baths, followed by active exercises in bed when the patient is able to move.

The patient is encouraged to try to walk within two to eight weeks after treatment is started. This is a gradual process, beginning with sitting up in bed and placing the feet on the floor from

the bedside, and concluding with exercises in the gymnasium.

Twelve out of 18 patients with hemiplegia, paralysis of one side of the body following brain hemorrhage, responded to this reconditioning program within 118 days. Treatment was begun two to four weeks after the onset of their illness. Three others of the group showed definite improvement while three did not respond to the treatment.

Nine out of ten additional patients learned to walk again after 67 days of treatment, with improvement being noted in the other patient.

Commander Lowman attributed the greatest factor in the success of the rehabilitation treatment to "cooperation on the part of the patient, fostered by his desire to regain his independence."

Science News Letter, June 5, 1948

AERONAUTICS

Safer Rough-Sea Landings

► AN experimental flying boat with a new type of lengthened hull, to permit safer landings in rough sea, has made its first flight, the Glenn L. Martin Company revealed. It was developed for the U. S. Navy, and its new hull is expected to improve materially the performance of flying boats.

The most striking feature of the Martin XP5M-1, as it has been designated by the Navy, is the length of its afterbody. By extension of the hull bottom to the extreme end of the plane, a much longer base is provided between the main and the rear steps. This lessens pitching and bouncing in rough water, and also protects the tail surfaces from the waves by the added buoyancy in the stern.

Model tests show that this added length will reduce the normal time and distance required for takeoff, and also give a smoother takeoff. On landing, the point of the step touches first and noses the plane down gradually so that skipping-off will not occur.

The new flying boat will require a crew of 11. Every reasonable provision for the men will be installed, including

heating and ventilation, bunks, and a galley for cooking so that they can stay aboard for several days at a time if necessary. It is powered with two Curtiss Wright engines, each of which develops 2,700 horsepower. When completely developed it is expected to have a greater range than present flying boats of its class.

Science News Letter, June 5, 1948

ENTOMOLOGY

New Deadly Spider Species Discovered in Palestine

► A NEW black widow spider species has been discovered in southern Palestine, before the beginning of the present turmoil made field work impossible. It has been given technical description by Dr. A. Shulov of the University of Jerusalem.

The new spider is more variable in both color and markings than its coal-black American relative. Its hue ranges from black with a brownish cast to a yellowish gray. The abdominal markings are yellow, and more elaborate than

the familiar red hourglass pattern of the American species.

It is apparently highly poisonous, for when captured specimens were permitted to bite a number of mice and rats most of the animals died.

It spins its webs in the open, on shrubs and wire fences. Most of its prey consists of beetles, but it also captures ants and occasionally even small scorpions.

Dr. Shulov has named the new species *Latrodectus revivensis*. The first or generic name it shares with all black widow spiders. The second or specific name refers to the settlement of Revivim, where it was first found. Full technical description is published in the biological journal, *Ecology* (April).

Science News Letter, June 5, 1948

SCIENCE NEWS LETTER

Vol. 53

JUNE 5, 1948

No. 23

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark. U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566 and 360 N. Michigan Ave., Chicago, STAtE 4439.

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MEDICINE

Dye Locates Brain Tumor

This radioactive spotting method, by which abnormal growths can be detected through skull and skin, has proved diagnostically successful in a dozen cases.

► BRAIN tumor detection by means of a radioactive dye that becomes concentrated in these abnormal growths and can be detected through skull and skin with a Geiger-Muller counter is the newest medical development in the use of atomic-pile byproducts.

It has been tried out successfully in a dozen cases at the University of Minnesota Medical School, and is reported in *Science* (May 28) by Dr. George E. Moore, senior research fellow of the U. S. Public Health Service.

It was already known that a dye called fluorescein has an affinity for tumorous tissue. To render it radioactive, Dr. Moore chemically tacked on some radioactive iodine, converting it into diiodo-fluorescein. Small, calculated quantities of this were injected into the veins of patients suspected of having brain tu-

mors, who were to undergo operations.

In a short time the blood had been carried to their heads, where the counters detected the presence of the radioactive atoms. Some of the iodine was present all over the brain, but on the patients' heads there were certain spots where the counters ticked much more rapidly than they did elsewhere. This was taken as indicating the possible presence of a tumor beneath that spot on the skull.

Subsequent operations proved the radioactive spotting method to have been correct in a large proportion of the cases.

The method is not considered infallible, and is to be used only in connection with other methods of diagnosis. So used, however, it should eventually be helpful.

Science News Letter, June 5, 1948

DENDROLOGY

Find Ancient Tree Species

► A TREE species that flourished on the earth long ago, almost in the days of the dinosaurs, long supposed to be as dead as they are and known only from fossils, turned up alive a short time ago deep in China's almost inaccessible interior. Closely related to the Sequoias of California, it bears the name *Metasequoia*, testifying to its kinship.

Now the man who first gave the news of its discovery to the Western world, Prof. Ralph W. Chaney of the University of California, has been able to obtain specimens, seeds and photographs. His trip started by trans-Pacific airplane but wound up on foot, for the final 125 miles or so of the journey was over ancient Chinese "roads" that in reality are mere foot trails. Part of the way he was carried in a sedan chair by coolies, but a good deal of it he had to do on his own two feet.

Metasequoia grows in moist mountainous country, but never much above 4,000 feet elevation, for it seems unable to stand winter weather. Its reddish bark is much thinner than the thick, corky covering of its American cousins,

so it would presumably be less resistant to fire. However, the wet habitats in which it grows minimize that danger.

Biggest *Metasequoia* seen and photographed by Prof. Chaney stands 98 feet high and is nearly six feet in diameter 11 feet above the ground, where its flaring buttresses end. With typical Chinese reverence for all things old, the natives of the region have erected a small temple at its base.

Unlike the American Sequoias, which are evergreen, *Metasequoia* loses its foliage in autumn, after the fashion of the bald cypress and the American larch or tamarack. When Prof. Chaney visited it, early this spring, it was still bare. The tree is also unlike the American species in that its spreading branches grow upwards, not at a downward slope.

In addition to the venerable "grandfather" tree, which is several centuries old, there are a considerable number of others, ranging in size from finger-thick saplings to mature trees three feet or more in diameter.

Prof. Chaney has planted the seed which he brought back with him in



GIANT METASEQUOIA — Dr. Ralph W. Chaney, at the foot of the "Dawn Sequoia," examines some of its twigs. With him is the commander of the armed escort provided by local Chinese authorities as protection against bandits.

greenhouses, and with the cooperation of the Save-the-Redwoods League will see that the seedlings are set out in places where they will have best chances for survival. (*See SNL, May 22*).

Science News Letter, June 5, 1948

ARCHAEOLOGY

Early Natives of Britain Built Greek-Like Temples

► THE religion of early inhabitants of England, 2,500 years ago, was apparently influenced by the culture of far-off Greece at least in the form of its temples. Evidence of this was uncovered during the construction of London's new airport at Hounslow Heath, W. F. Grimes, director of the London Museum, reported in the American journal, *Archaeology* (Summer).

When the site of the new airport was selected, an air survey was made to spot any possible traces of prehistoric occupancy not noticeable from the ground. The photographs clearly picked out the outlines of an earthwork once popularly known as "Caesar's camp," but in recent decades all but obliterated by cultivation.

Skimming off the surface soil with earth-handling machinery, the archaeolo-

gists found the round outlines of a group of huts, of the type built by early Iron Age inhabitants of Britain about 500 B.C. At one edge of the village group they came upon postholes and a ditch marking where a rectangular building, quite unlike the huts, had once stood.

Detailed examination showed that this structure, presumed to be the town tem-

ple, had consisted of an oblong inner room, 18 by 13 feet in size surrounded by a row of pillars. This is the basic design of a Greek temple. Apparently these early natives of Britain had built in wood a fair replica though in reduced size of what the Greeks of the time were erecting in stone at the far end of the Mediterranean.

Science News Letter, June 5, 1948

ELECTRONICS-PHYSICS

Sound Detects Heat Waves

New instrument is called an acoustical interferometer and may be used to detect invisible light signals or short radio waves used in radar.

► INVISIBLE infra-red light, or heat waves, are detected by sound too high-pitched for the ear to hear by a new instrument revealed at the University of Illinois. It has practical as well as laboratory applications, such as the detection of invisible light signals, possibly in obtaining pictures not obtainable otherwise, and perhaps to detect the short radio waves used in radar.

The instrument is called an acoustical interferometer. It consists of two quartz crystals such as used in radio with a gas confined between them. A transmitter sets one crystal into vibration, and a receiver detects vibrations carried by the gas to the other crystal. When infra-red rays strike the gas they affect the vibration waves.

Certain types of quartz crystals have what scientists call piezo-electric properties. If a properly cut slice is pressed so as to flatten it slightly, opposite electric charges appear on the two surfaces. If the faces are pulled so as to thicken the slice, electrical charges appear in the reverse direction. In other words, vibration within the crystal sets up electrical energy. If electric charges are placed on the faces of the crystal, vibrations are set up within it which pass as sound waves

into the surrounding atmosphere.

In the new instrument, developed by Prof. W. J. Fry and his associates, the inaudible sound waves, called ultrasonic waves, are produced by connecting a radio transmitter to one quartz crystal and tuning the frequency to that at which the crystal vibrates naturally. The supersound waves set up travel through carbon dioxide containing water vapor or some other gas, to the other crystal, causing a vibration within it which produces tiny electrical impulses. These are amplified in a radio receiver and measured.

If invisible infra-red radiation is passing through the gas, it has an effect on the vibrations in it. Part of the light waves may be absorbed. The light that emerges may be examined to see how it has been changed by the gas in quantity and color.

A more important effect, however, is that of the light on the gas. The gas molecules are changed so that they absorb less of the sound waves passing between the two crystals. The infra-red modifies the sound so that the second crystal sends out changed electrical impulses to the radio receiver, and these may be instantly detected.

Science News Letter, June 5, 1948

BIOCHEMISTRY

Antibiotic from Bee Killer

► A GERM that brings wholesale death to honeybees may provide a strong weapon for the defense of human and animal health, it has been discovered at the bee culture laboratories of the U. S. Department of Agriculture at Beltsville, Md., by Dr. Eugene C. Holst.

The germ is the one that produces the serious disease of infant bees known as American foulbrood; its scientific name is *Bacillus larvae*. From it can be produced, either by direct extraction of the "scale" which it causes or by culturing on a nutrient medium, an antibiotic, or

drug of the same family as penicillin and streptomycin. The new antibiotic has not yet been formally christened.

Among the bacteria against which the new substance has been found effective, in laboratory tests, are those that cause boils, blood poisoning, septic sore throat, undulant fever, spontaneous abortion in cattle, and both human and bovine tuberculosis. It has an unusually wide range of effectiveness, although some germ species do appear to be resistant to it. Much more work on experimental animals is considered necessary before clinical use can be undertaken.

On his discovery, Dr. Holst has been granted U. S. patent 2,442,006, which he has dedicated to the free use of the people of the United States.

Science News Letter, June 5, 1948

ENGINEERING

New Thin Asbestos Paper Developed for Insulation

See Front Cover

► A NEW type of asbestos paper, thin as a human hair, has been developed by General Electric company of Schenectady, N. Y. It is for use as insulation in high-temperature electric equipment, and can easily withstand the flame of a blowtorch, as shown on the cover.

It is made of nearly pure asbestos and some mineral substance such as clay. It is free from any metallic matter which would lessen its value as an insulator. In an accelerated aging process equivalent to 100 years, this new insulator, which will be known as Terratex, retained its natural color and other physical properties.

Science News Letter, June 5, 1948

VETERINARY MEDICINE

Fourth U. S. Scientist Joins Foot-Mouth Group Abroad

► WHILE the Department of Agriculture completes final arrangements for acquiring an island off the state of Rhode Island, as a research center for foot and mouth disease, another American scientist has gone to Europe to join the war on the cattle menace.

Dr. Stewart H. Madin of the University of California is sailing for Europe to join three U.S.D.A. scientists who are already at work on the disease in European laboratories. Foot and mouth disease is prevalent in Europe, and several governments there have had laboratories working on the disease for many years.

The new U. S. research center being planned for Prudence Island off Rhode Island will be the first of its kind for this country. Because there is no foot and mouth disease in this country, the law authorizing the laboratory required that it be located on an island not connected with the mainland.

Funds for the purchase of the site are available, but a new appropriation will be requested from Congress for construction of the laboratory, which is expected to cost more than \$25,000,000.

Meanwhile American scientists are continuing to help Mexico in beating back the disease which is now estimated to be some 300 miles south of the Rio Grande at its closest occurrence to the U. S.

Science News Letter, June 5, 1948

CHEMISTRY

2,4-D More Potent When Combined With Latex

➤ 2,4-D kills plants more quickly and surely when it has the help of a synthetic-plastic latex known by the trade name of Geon 31X.

This has been discovered in experiments at Michigan State College reported by Drs. C. L. Hamner and Kiang Chi-Kien.

Kidney-bean seedlings were treated with the sodium salt of 2,4-D by dipping leaves into solutions of various strengths, from five to five hundred parts per million. Some of the plants were subsequently sprayed with the latex, while the rest were left unsprayed, as controls.

All the plants treated with the strongest solution of 2,4-D died, but those treated with weaker solutions and left unsprayed with the latex recovered and continued growth, after greater or less evidence of poisoning. But mortality in the plants treated with both 2,4-D solution and the latex spray was very high.

Then the treatment was tried on oat seedlings, which normally are not affected by 2,4-D, since they belong to the grass family. However, while those that received only 2,4-D showed no ill effects, those that were afterwards sprayed with the latex died as the bean seedlings had done.

The two experimenters do not know what the latex spray does to make the 2,4-D more effective, but suggest that by forming a covering film it may insure greater penetration of the tissues.

Science News Letter, June 5, 1948



DECLINE OF THE BISON—In front is shown the skull of half-million-year-old *Superbison latifrons*, 80 inches from tip to tip of the horn cores, while at the left is an intermediate form, *Bison antiquus barbouri*, in the hands of Dr. C. Bertrand Schultz. The dwarfed specimen at the right is a modern bull bison's skull, held by W. D. Frankforter.

PALEONTOLOGY

Early Bison Were Giants

➤ IF BUFFALO BILL had gone a-hunting in the Wild West of a half-million years ago he would have had to carry an anti-tank gun for a rifle. He would have had to take along Paul Bunyan to be his skinner, using a bulldozer blade for a knife. That's how big the bison were in those days.

The first of these great shaggy beasts that roamed the Plains had a spread of 80 inches—nearly seven feet—from tip to tip of his horn cores. Those are the measurements of fossil skulls of that age, found in river gravels of early Ice Age date, as measured by Dr. C. Bertrand Schultz and W. D. Frankforter of the University of Nebraska State Museum.

Horn cores are the bone supports over which the hollow horns of animals of the cattle family fit. The horn substance has disappeared from all fossil skulls thus far collected, so the actual horn-spread of these ancient giants can only be inferred; but a ten-foot spread would not seem excessive. If the rest of the animal was built in proportion, this earliest "thundering herd" must have been of near-elephantine size. No wonder that zoologists have suggested a new name for the ancient genus: *Superbison*, instead of merely *Bison*.

This particular species has been given the full name of *Superbison latifrons*, which means "broad-faced super-bison"

—an eminently justified title.

This earliest of known bison was also the biggest. All later species (and there were some giants in later Ice Age times) were smaller than this great-granddaddy of the herd. This seems to be contrary to the evolutionary history of other large animals: horses, camels, elephants, rhinoceroses, all started small and became larger in the course of their development, as fossil records show.

This seeming contradiction may be due to the fact that we do not have nearly as complete a fossil history of the bison as we have of some of the other animals, notably horses and elephants. Despite their distinctively American character, bison did not originate on this continent. The giants studied by the Nebraska paleontologists were immigrants from Asia, arriving via the land bridge that existed across Bering Strait in Ice Age times and never blocked by the ice which had its greatest development farther towards the east. So the earlier, and possibly humbler, ancestors of the bison may still be buried deep beneath Siberia's perpetually frozen soil.

Be that as it may, the various species of bison that have existed between Old Broadface with his seven-foot horn cores and the present-day bull bison with a mere two-foot spread became smaller and smaller as time went on.

Science News Letter, June 5, 1948

PALEONTOLOGY

Deformed Indian Skulls Flattened Deliberately

► INDIANS of Mexico and parts of the Southwest a few centuries before Columbus had a marked flattening of the top of the back of the head.

The flattening is believed to have been produced by deliberate pressure applied to the heads of infants. In one case, a sort of three-horned man was produced with the skull sticking up on two sides and the front.

Skulls of this type are now being studied by scientists at the Smithsonian Institution in Washington. They have reported that the practice, known as "lambdoid flattening," was very common in Mexico centuries ago and has been found as far north as Utah.

Science News Letter, June 5, 1948

CHEMISTRY

Better Rubber for Tires Made from Sugar and Soap

► SUGAR and soap are helping make better automobile tires, the American Chemical Society was told in Philadelphia by Prof. Carl Shipp Marvel of the University of Illinois. They are used in a so-called redox process in which synthetic rubber may be manufactured at freezing temperature.

The quality of GR-S, the synthetic rubber blended with natural rubber in all tire treads, has been greatly improved by the recent development of the amazingly rapid redox process, he said. This new method makes it possible to manufacture rubber at freezing or sub-freezing temperatures instead of at 212 degrees Fahrenheit, the conventional temperature.

The quality of GR-S and similar rubbers seems to go up as the temperature goes down. GR-S is essentially a combination of two petroleum compounds, butadiene and styrene, which are made to unite or polymerize by a chemical stimulant, or catalyst. In the redox process, the compounds are first emulsified with a soap, and the reaction is started by a type of sugar called the activator.

Science News Letter, June 5, 1948

AERONAUTICS

90-Passenger Transport Promised by British

► A GIANT airplane, capable of carrying 90 passengers or 12 tons of freight, will be ready for a test flight in less

than a year, it was revealed in London. It is one of the largest planes which the British aircraft industry is undertaking at the present time.

Two of the type are under construction. They are being built by General Aircraft, of Feltham, Middlesex, and the plane will be known as the Universal. Parts manufactured at Feltham will be assembled at the Southampton airport.

The Universal will have a wingspan of 162 feet, a height of 31 feet, and a length of nearly 100 feet. It will be powered by four Bristol Hercules air-cooled radial engines giving a total of 7,800 horsepower. Its cruising speed will be under 200 miles an hour, but fully loaded it will be able to clear a 50-foot obstacle in only a half-mile from the start of the take-off.

Some of the proposed Universals will seat 30 passengers on an upper deck and have space for some nine tons of cargo below. This is to satisfy demands where a combination passenger and freight airship is required.

Science News Letter, June 5, 1948

AERONAUTICS

Solve Aviation Mix-up On English And Metric Units

► A SOLUTION for the aviation confusion in international flying due to use of English and metric units in airplane communication has been worked out in Montreal by the International Civil Aviation Organization representing 48 nations, including the United States.

The plan, involving a proposed table of units, takes the form of an international standard to be incorporated into the legislation of the member nations. It proposes a condensation from five dimensional standards into one in a ten-year period. After New Year, 1959, complete world-wide standardization in aviation communication would be achieved.

When this standard is reached, distances would be given in nautical miles, altitudes in meters, horizontal speed in knots and vertical speeds in meters per second. Wind direction and velocity would be in degrees and knots, cloud heights in meters, and visibility in meters or kilometers. Altimeter setting would be in millibars, temperatures in Centigrade and weight in kilograms. Time would remain the day, the day beginning at midnight, Greenwich mean time.

Science News Letter, June 5, 1948

IN SCIENCE

GENETICS

Plant and Insect Changes Produced by Ultrasonics

► EVOLUTION of new varieties of plants and insects has been forced by treating parents' cells with sound waves too short and rapid to be heard by any ears, by a three-man research team in the laboratories of the University of Connecticut at Storrs, Conn.

Electrically driven vibrating crystals, producing ultrasonics at four hundred thousand cycles per second, were used on three different kinds of plants and on young fruit flies. Subsequent growth showed changes of kinds usually regarded as genetic, and microscopic examination of the cells confirmed this by displaying changes in the structure and arrangement of the heredity-carrying chromosomes.

A preliminary report on the work is given in *Science* (May 28) by Drs. R. H. Wallace, R. J. Bushnell and E. H. Newcomer, who state that more detailed accounts will be published elsewhere later.

Science News Letter, June 5, 1948

MEDICINE-BIOLOGY

AEC Announces Program of Study in Medicine, Biology

► A COAST-TO-COAST program of 38 research projects in medicine and biology to be conducted in 29 non-government laboratories was announced by the U. S. Atomic Energy Commission. The Commission has made available \$1,300,000 for the projects.

The subjects for the studies range from genetics of fruit flies and corn and the nutrition of tapeworms to cancer research and airborne infectious diseases.

Radiation-induced gene and chromosomal mutations in drosophila (fruit flies) and corn will be investigated at the California Institute of Technology, Pasadena. Research on the nutrition of tapeworms will be conducted at Rice Institute, Houston, Tex. The Memorial Hospital for Treatment of Cancer, New York, will study cancer and the distribution of isotopes in therapy. Work on airborne infectious diseases will be done at the University of California, Berkeley.

Science News Letter, June 5, 1948

THE FIELDS

ENGINEERING

Musicians and Designers Of Instruments Differ

► MUSICIANS and the engineers who invent new musical instruments do not always agree about music and its instruments. The controversy is being aired in the *Journal of the Acoustical Society of America* (Nov., 1947; May, 1948).

The inventor of several electronic musical instruments, B. F. Miessner, Morristown, N. J., recently complained that both musicians and the musical instrument industry "are extremely backward in accepting, manufacturing and using new instruments, or improvements of old ones."

In his letter to the editor of the *Journal*, Mr. Miessner concluded with the charge that "Music . . . is still where it was a hundred or more years ago."

Exception to this and other of the inventor's views is taken by H. L. Robin of the Juilliard School of Music in New York.

Mr. Robin argues that new electronic musical instruments "do not seem designed for constructive musical purposes."

As examples to support his argument, he lists:

"An organ which is less expensive than previous pneumatic types and which can be used in every small church or home.

"A violin whose intensity range far exceeds that of the conventional violin.

"A piano which, by the use of amplification, can be made to simulate an already existing piano tone."

These new instruments, Mr. Robin, suggests, were built for "extra-musical considerations."

Both Mr. Robin and Mr. Miessner agree that musicians and instrument designers ought to work together more.

Science News Letter, June 5, 1948

METEOROLOGY

Low Atmospheric Pressure Induces Fast Tree Growth

► THE LESS air there is over the Northern Hemisphere, the faster trees grow in the Far North. This curious correlation has been worked out by G. W. Brier, U. S. Weather Bureau sta-

tistician, who calls attention to the phenomenon in a letter to the editor of the British journal, *Nature* (May 8).

It is not generally known, but there is an actual migration of air from north to south in winter, and a return flow in summer. However, these annual atmospheric tides are not always equal, so that there may be a pile-up of air over one hemisphere, with a correspondingly lowered atmospheric pressure over the other.

This is what happened in the 40-year period from 1899 to 1939, with the pressure deficit remaining persistently north of the equator.

Science News Letter, June 5, 1948

NUTRITION

K-Ration Fruit Bar Is Made More Tasteful

► TOO late for millions of World War II GI's, scientists at the University of California College of Agriculture have made a better tasting version of the dried fruit bar in the Army's K-ration.

They added chopped toasted almonds and honey or corn syrup. The result is said to be a 100% more tasty bar.

GI fruit bars were about half raisins, with prunes, apples, figs, apricots and a little ground candied orange peel.

Dr. W. V. Cruess and students John Brekke and Henry Seagrave-Smith have developed this new recipe: 20 parts Muscat raisins; 20 parts Calimyrna figs; 20 parts chopped toasted almonds; 20 parts honey or corn syrup; 15 parts dried apricots; and five parts candied orange peel.

Science News Letter, June 5, 1948

BOTANY-MEDICINE

Establish Herbarium To Study Hay-Fever Plants

► A NATIONAL hay-fever herbarium, in which will be gathered hay-fever-causing plants and their pollens from all over the country, is being established under the auspices of the American Academy of Allergy by the University of Illinois College of Pharmacy at Lisle, Ill., in connection with the College's proposed drug plant experiment station. The collection will be in charge of Prof. Ralph H. Voigt.

Physicians, botanists and other persons with scientific interest in hay fever and the plants that cause it will be able to obtain slides of positively identified pollens from the new collection, and to examine the pressed specimens there.

Science News Letter, June 5, 1948

CHEMISTRY

Semi-Plastic Coating for Brick Is Water-Repellent

► BRICK and other porous masonry surfaces are protected from moisture by a new semi-plastic coating, applied in a water solution by brush or spray, which becomes invisible after drying.

Unlike other types of invisible transparent surface coatings, which are usually solutions of waxes or stearates in inflammable solutions, this is an opaque, milky-white, non-inflammable water emulsion containing water-repellent organic ingredients. After application it becomes absolutely transparent.

The new product, first developed during the war and used by the armed services, is called Aquaphane and was perfected by Dr. Hugo Silbermann, an Americanized scientist from Czechoslovakia, now with International Aquella Products, Inc., Rockefeller Center. The material is not applicable to wood, metal, marble or other solid masonry work. When applied to common brick and other porous masonry it has long life and prevents water absorption from rain, dampness, snow and sleet.

Science News Letter, June 5, 1948

MEDICINE

To Test Anti-Malarials at Central American Airbase

► A CENTRAL American airbase of the Department of the Air Force is to be the site of a new attack on malaria.

Scientists of the U. S. Public Health Service will conduct a two-year test program on new anti-malarials at the Puerto San Jose Air Field on the Pacific Coast, 70 miles from Guatemala City, capital of that Central American country.

The project is hailed as the first opportunity to test new drugs against malaria in an area where the disease is prevalent. Workers at sugar and coffee plantations in the region will be given the drugs to help them fight the disease and assist scientists in evaluating the anti-malarials.

Dr. Charles G. Dobrovolsky of the Public Health Service will direct the program which will include both U. S. and Guatemalan scientists. Cooperating with the Public Health Service on the program are the Guatemalan government and the Pan-American Sanitary Bureau.

Science News Letter, June 5, 1948

GEOLOGY-ENGINEERING

Man-Made Fuels Needed Now

It will take a long time to find and extract all the crude oil from underground deposits, therefore synthetic liquid fuels are essential to supplement this supply.

By A. C. MONAHAN

► "SHALL I filler-up, mister, with this new synthetic gasoline? Understand it's made just right from coal, shale or natural gas."

It's a guess as to how soon the fellow at the filling station will be saying that. Or how soon you will be running your old or new car on gasoline, either oil-born or synthetic, mixed with ethyl alcohol—the kind that can be drunk.

The day when this will be possible is not too far in the future. The oil industry is preparing for it, and plants are under construction or being planned.

Methods for making synthetic liquid fuels are well known. Present costs are important factors, however. Before these synthetic products can compete on a price basis with the products of the natural crude oil more economical manufacturing processes must be developed. Otherwise the use of man-made fuels will await the higher prices that may be expected as crude oil deposits become harder to find and more costly to work.

Plenty of Petroleum

There is plenty of petroleum in the crust of the earth to last for many generations, many geologists believe. The problem is how to find it and how to get it out. Much of it is in the underwater continental shelf that extends from coastline far out beneath the sea. Much is in icebound areas north of the Arctic Circle. Then perhaps there are hidden deposits a mile or two deeper than the present known reserves.

To get oil from any of these sources will cost a great deal of money. In fact to discover oil deposits within the continental United States is a costly procedure and growing more so as time goes by. Geologists can locate areas favorable to oil deposits, but there is only one sure way to actually find oil. That is by boring, and well-drilling is expensive.

An exploratory well in the oil industry is a wildcat. Companies drill on the advice of geologists but the geologists are often wrong. If no oil is struck the well bored is a dry hole. Over 87% of the

5,000 American wildcats drilled in 1947 turned out to be dry holes. Of some 20,000 wildcats drilled in the past five years, considerably over four-fifths were dry holes.

In efforts to find deeply-hidden oil, many wells over 10,000 feet deep have been drilled. One at Fort Cobb, Okla., was carried down to 17,600 feet, or over three and one-half miles. It was not productive. Oil is being produced from the Gulf coast of Louisiana and Texas from below 10,000 feet, and in a few cases from below 13,000 feet. These deep wells cost from \$250,000 to \$350,000 each. Their cost, and the cost of all exploratory wells and geological surveys in search of oil is all finally borne by the consumers of the petroleum products.

Will Take Many Years

It will take many years to get the oil in known deposits out of the ground. This means that synthetic liquid fuels may be needed to supplement crude oil production long before the underground reserves are exhausted. Taking oil from underground is not like pumping it from a tank. It is distributed in tiny spaces in what are called oil-bearing sands, usually sandstone and limestone. It takes time for the petroleum to seep to the area from which pumped.

Some American oil fields have been producing for 80 years or more, and will probably continue to produce for another 20 years. Their daily production has of course greatly decreased. Oil was taken from most old fields as rapidly as possible before conservation practices were established, but nature through her own physical laws prevented their rapid and complete exhaustion.

The greatest untapped source of crude oil in the world is probably the continental shelves which one petroleum geologist estimates contain 1,000,000,000,000 barrels of oil. These submerged areas extending from a few to a few hundred miles out from shorelines under the oceans, have a geological history favorable to oil formation. Their national ownership inside the three-mile limit is unquestioned.

Beyond this limit, they have long been

open to anyone. Waters over continental shelves are fish-feeding grounds, and fishing fleets of all nations have used them without interference. Now the situation has changed. The United States claims the American continental shelf areas as under American jurisdiction for both fishing and mining activities. This claim is by Executive Order of Sept. 28, 1945. It interferes in no way with ordinary navigation.

Natural Gas

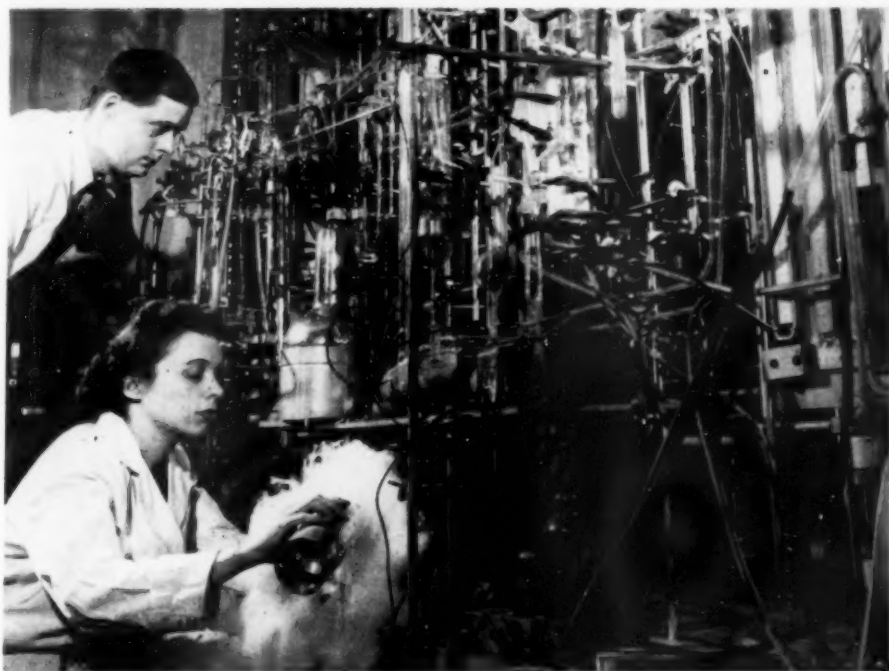
The first man-made gasoline and fuel oil to enter the American commercial market will probably be made from natural gas as a source material. Two giant plants, one in Texas and the other in Kansas, are now under construction for this purpose. The Texas plant will use gas much of which is now wasted, the Kansas plant will use a natural gas which has too low a heating value to use for ordinary gas heating or lighting.

Known reserves of natural gas have increased more rapidly than reserves of oil. Some state that there is enough to make quantities of gasoline from it for 25 years without endangering the supply needed for future years for heating and lighting. Others claim a much larger supply. One oil man recently stated that in Texas alone over 1,500,000,000 cubic feet of gas are being blown into the air every day. Its only present use is to assist in the production of oil.

The cost of gasoline from natural gas is relatively low. The products can be put on the market at prices competitive with those from natural petroleum. The investment in plant and equipment, however, is high.

The supply of shale containing oil, usually called oil shale, is very great. The largest deposit is in a Colorado area that extends well into Utah. But it is found also in California, Indiana and Kentucky. A U. S. Bureau of Mines pilot plant, now producing many barrels of oil a day, is located at Rifle, Colo., not far from the Utah line. There is enough oil shale in America to yield an estimated 95,000,000,000 barrels of oil if all could be extracted.

From work already done, it appears that oil from oil shales can be extracted even now at prices comparable to those for the average cost of production from wells. However, the product has different



SYNTHETIC FUELS—Radioactive atoms are used by Gulf Oil scientists in probing the still mysterious reaction by which gasoline is produced from coal.

characteristics and is better for production of diesel and other fuel oils than it is for gasoline and aviation fuel at the present time. New methods of refining may change this situation later.

Coal may be rapidly losing its right to be called the king of fuels, but it gives promise of being the father of fuels in the form of liquids. Coal for years has been the chief source of mechanical energy, but it took second place to oil and natural gas in 1946. Even for locomotives, coal is becoming secondary; over 90% of the locomotives now under construction are diesels, and one new diesel appears on the tracks every week to ten days.

Two Methods

There are two methods of producing synthetic liquid fuels from coal; the hydrogenation method and the Fischer-Tropsch process. Both have been used in Germany for several decades. Both are experimentally used in America, and developments already made are improvements on the German processes. The product is at least equal in quality to that being made from well oil, but the cost is still relatively high.

Laboratory work on the synthesis from coal is being done by the U. S. Bureau of Mines and by at least two coal and oil company combinations. The Bureau of Mines is building a large-scale demon-

stration plant at Louisiana, Mo., and a commercial plant is under construction near Pittsburgh.

Blending one gallon of ethyl alcohol with nine gallons of low-grade gasoline will make ten gallons of premium grade anti-knock motor fuel, Dr. G. E. Hilbert, of the U. S. Department of Agriculture, recently said. He is director of the department's regional laboratory at Peoria, Ill., where work is being done to develop liquid fuels from vegetable matter, particularly farm wastes. The advantage of a mixture of alcohol in gasoline for motor fuel has long been known but used relatively little because of the cost of the alcohol.

The process of making alcohol from grains for beverages and other purposes is well known and highly developed. Ordinarily there is not enough surplus grain to make alcohol from it for automobiles. But there are great quantities of corn cobs and other farm wastes from which ethyl alcohol can now be successfully made.

The cost is still too high, however, to use the alcohol as a motor fuel, but the outlook for a cheaper process is promising. One factor in cost is the transportation of the farm wastes to the alcohol-making factory. They are bulky to ship. Then to make a profitable business, uses for byproducts must be developed. Some could be used for making wallboard and

plastics, or even briquetted for household heating. Corn cobs, for example, yield such valuable byproducts as xylose, butanol, acetone and furfural. Among many uses for the last is in the making of nylon.

Despite the fact that the per capita consumption of petroleum products has risen from 367 to 608 gallons during the past nine years, that there are now a million more passenger cars on the road than in 1941, and that about 4,500,000 families are using liquefied petroleum gases for fuel, there is actually little danger that America will be without liquid fuels for centuries to come.

Science News Letter, June 5, 1948

ENTOMOLOGY

World's Food Crisis Made Worse by Insect Pests

► WORLD food shortages are being made worse by insect pests, which make hungry humanity eat at second table. With the world's population increasing at its present rate, our present tolerance of these thievings and spoilages must end, declared Dr. Fred C. Bishopp, assistant chief of the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture.

Dr. Bishopp spoke as guest of Watson Davis, director of Science Service, on *Adventures in Science*, heard over the Columbia network.

Much of the insect loss that used to be regarded as inevitable can now be prevented, thanks to DDT and some of the other new insecticides, Dr. Bishopp stated. Notable instances of successes already achieved which he cited are reductions in the hundred-million-dollar losses to the meat and dairy industries caused by tormenting flies, elimination of tick-borne cattle fever in the South, increase in the potato yield in Maine from 253 bushels per acre to 358, and the virtual elimination of houseflies from many cities and large areas in the country as well.

Although cotton is commonly thought of as a textile crop it is an important food crop as well, Dr. Bishopp pointed out, because of the oil from its seed and the seed meal that is fed to livestock. Cotton-attacking insects in one year cut the seed yield by 613,000 tons, worth \$44,000,000. This would have provided enough refined oil to make 200,000,000 pounds of margarine, meeting the minimum needs of 8,000,000 people. Cotton insects alone, therefore, are worth the

Do You Know?

The term *saran* applies to a series of resins chemically known as vinylidene chloride copolymers from which many plastic articles are made.

Flexibility is the property of *glass fibers* which distinguishes them from other glasses; they are flexible merely because they are exceedingly thin in relation to their length.

Electrochemical processes are being used more and more in industry for the preparation of a variety of materials such as chlorine and other gases; they are increasingly used also in refining metals.

The famous *Kensington stone*, so-called because found near Kensington, Minn., is now at the Smithsonian Institution, Washington, D. C.; its runic inscriptions purport to be the last message of a lost Norwegian exploration party perhaps massacred by Indians in 1362.

ORDNANCE

Shotgun Fired By Bringing Up Against the Shoulder

► A SHOTGUN that can be fired by merely bringing it sharply against the shoulder, without touching the trigger, is the subject of patent 2,441,787, granted to Ernest Zryd of Beloit, Ohio. A movable section of the butt-plate is linked to the trigger mechanism by means of a rod running through the butt; when this is pressed it fires the piece. It is thus possible to use the weapon with mittened hands in cold weather.

Science News Letter, June 5, 1948



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waging of a major battle.

The world's unappeasable hunger for bread gives great importance to the fight against insects that attack stored grain, the speaker continued. We have been losing about 300,000,000 bushels of stored grain every year, worth more than \$600,000,000 at present prices.

CHEMISTRY

Urge Sharing of Isotopes

American scientific group proposes that the international office of the United Nations be empowered to distribute isotopes for research abroad.

► DISTRIBUTION of "non-dangerous" isotopes, by-products of the piles which are used to make atomic bombs, by an international office of the United Nations was proposed by the Federation of American Scientists meeting in Washington.

The Federation emphasized that the isotopes are important for research in medicine, agriculture and industry but are not useful for making atomic bombs. The suggested international office would set standards for the handling and naming of the isotopes in addition to serving as a clearing house for distribution of the material.

Although the U. S. has a near monopoly of these isotopes at present, the Federation report said that small uranium piles which can produce these important by-products are now operating in Canada and Great Britain.

"In France and probably the U. S. S. R., such piles are scheduled for early construction and operation," it was reported. Other countries listed as planning production of isotopes are Sweden, Norway, and India.

Setting up an office for international distribution of isotopes would aid the international exchange of scientific information, counteract ill feeling toward this nation by some scientists abroad and advance the peaceful uses of atomic research, the report contended.

Warning of a "disturbing change" in the attitude of some scientists in non-English-speaking countries toward the U. S., the report declared, "Upon investigation we believe most of the accusations and suspicions regarding American behavior to be unwarranted, but the circumstances are such that denial is difficult or impossible."

A system of international distribution of isotopes would bring about better un-

derstanding among scientists of many nations, the Federation argued.

The report suggested that an international organization such as the United Nations Atomic Energy Commission, the World Health Organization or the United Nations Educational, Scientific and Cultural Organization call an international conference on isotopes.

Science News Letter, June 5, 1948

"We believe that the discussions might lead to an executive agreement or charter setting up an international office within the United Nations framework to deal with the distribution of isotopes," the report said.

The Federation explained that distribution of isotopes by a UN group might not help in reaching an agreement in the control of atomic weapons, but the report said that an international institution operating in the field of atomic energy might "modify some viewpoints regarding control."

Prof. Arthur Roberts, physicist at the State University of Iowa and chairman of the Federation, said that "the proposal might well be undertaken by the United Nations Atomic Energy Commission if the General Assembly deems it advisable."

Science News Letter, June 5, 1948

SOCIOLOGY-PHYSICS

"Social Physics" Applies Laws of Gravity to Income

► A NEW science in which laws of gravity are applied to such matters as rents, land values or the national income was described to the Population Association of America meeting in Philadelphia by Dr. John Q. Stewart, associate professor of astronomical physics at Princeton University.

Although "social physics" is only in its early stages and not yet accepted as

a science, Dr. Stewart said that the principles of mathematical physics can be used in the social field.

Individuals are treated as molecules, he explained. Persons are given "molecular weights," in the way physicists have assigned weights to molecules and atoms. Some individuals have a "weight" of two, while individuals in some groups rate only one-third in the weighing.

With this system, Dr. Stewart has used equations of Newtonian gravitation in what he terms demographic gravitation. The results, which may come out in such units as "persons squared per mile," will show the national income or any of a large variety of other social statistics.

City suburbs, he explained, can be

compared with the satellites of planets in the solar system. When a satellite gets too close to a planet, it is torn apart. A village near a city "is drawn out in long lines in the direction of the overpowering attraction of the central city," he said, unlike the more isolated village built around a center, or nucleus.

Even the gas laws of physics can be applied to humans, Dr. Stewart contended.

Individuals want some living space of their own which gives the "human gas" a tendency to expand. Populations of cities, he suggested, are a compromise between gravity toward the centers of attraction and the expanding feature of gas.

Science News Letter, June 5, 1948

ENGINEERING

Low-Temperature Battery

Minus 100 degrees is the functioning capacity of new electric batteries now under development. They will have military as well as civilian applications.

► **ELECTRIC** batteries that will function at a temperature of 100 degrees below zero Fahrenheit are under development for the Army Signal Corps at Ohio State University, it is revealed. Experimental test cells which will operate at this temperature have already been constructed.

Batteries for use at extremely low temperatures have many military applications, but have civilian applications as well. High-flying airplanes in the stratosphere encounter temperatures from 60 to 70 degrees below zero. Guided missiles and the battery-powered radio-sonde, which is carried aloft to report weather conditions by radio, may meet even lower temperatures. Automatic ground-based weather stations in Arctic regions may be required to record and report the lowest temperatures found on the surface, and cold chambers used in research work sometimes have temperatures lower than any known that nature provides.

The selection of an electrochemical system was one of the first problems in developing a low temperature battery. It must be able to withstand long periods of storage under all atmospheric conditions, and not freeze at minus 100 degrees. The electrolyte must not disintegrate at normal or high heat, and also have the proper electrical characteristics to operate equipment at very low temperatures.

In the investigations already made, several solvents that possess the necessary characteristics have been uncovered. Solute-solvent systems were then studied to find good conducting mediums which would keep the internal resistance of the battery at a minimum when far below zero. Present research is directed toward electrode materials to determine the most suitable electrochemical couple, the proper combination of materials to produce electricity, for low temperature operation.

Science News Letter, June 5, 1948

CHEMISTRY

Benzene Hexachloride Found to Flavor Pork

► **BENZENE** hexachloride or 666, potent new insecticide, has been highly successful in ridding hogs of lice and mange; but it is inadvisable to use it on the animals just before they are slaughtered. Experiments in support of this conclusion were reported by Dr. R. H. Grummer, R. W. Bray and Dr. Gustav Bohstedt of the University of Wisconsin.

They treated three lots of pigs with the insecticidal dust, and part of them they also sprayed with a benzene hexachloride solution a short time before slaughtering them. Meat from recently-sprayed animals had "off" taste and

odor when tested by several judges. Cooking smells, described as "medicinal," persisted in the kitchen for a long time after the meat was prepared.

For these reasons, the three scientists recommend that no benzene hexachloride treatment be given hogs for at least ten days before slaughter.

Science News Letter, June 5, 1948

MINERALOGY

New Argentine Mineral Named for National Hero

► A **NEW** mineral has been discovered in Argentina and named after a national hero.

The mineral, called sanmartinitite, was found southwest of San Martin. The name is for the city which in turn was named for Gen. Don Jose de San Martin, a leader in the fight for South American independence.

Sanmartinitite is a zinc tungstate, first spotted in the study of a sample of tungsten ore. It is a member of the wolframite group of minerals.

First report of sanmartinitite in this country was made to the Academy of Natural Sciences of Philadelphia by Victorio Angelelli, Argentine geologist, and Samuel G. Gordon, associate curator of mineralogy and petrology of the Academy.

Science News Letter, June 5, 1948

WILDLIFE

Porcupines Chew Glass, Gnawed Bottle Shows

► **GLASS-EATING** is not confined to a few humans with abnormal appetites; porcupines do it, too. So declares F. W. Preston, glass technologist of Butler, Pa., and to prove it he exhibits a catsup bottle with a hole chewed clear through one wall near the bottom. The unusual specimen was given to him by John Hopkins, a game warden in the hills near Clarendon, Pa.

On this and other bottles bearing porcupine tooth-marks, the animal had apparently set one pair of its chisel-like incisors against the edge, and forced the opposite pair towards it with its powerful jaw muscles, loosening small chips of glass.

Why the animals should want to chew up bottles is still unguessed, unless perhaps it is an appetite for small amounts of the alkali that leaches out of the glass on exposure to the weather.

Science News Letter, June 5, 1948



Sweets From Trees

► HONEY that you find on the market is most commonly labelled "clover honey" or "alfalfa honey." That is understandable enough, for there are enormous acreages in alfalfa and the various kinds of clover, and since every flower that is to produce merchantable seed must be visited by a bee, there is naturally going to be a lot of honey produced from their nectar.

However, there are a number of flowering trees that are copious producers of nectar, and that in their season are eagerly visited by bees. Their honey is not always identified for market purposes; but persons with a discriminating sweet tooth know their special fragrances, and will proclaim the virtues of their favorite tree honeys as connoisseurs enthuse about their pet wines.

Excellent honey is produced, for ex-

ample, from the nectar of tulip-tree flowers. The tulip-tree is abundant over most of the country east of the Mississippi, and although its flowers do not last long they produce a copious nectar-flow, enabling the bees to fill much comb with this type of honey in a short time. A related type of fragrant honey, sometimes met in the South, comes from the flowers of the tulip-tree's close kindred, the magnolias.

Of the South also, and the Southwest, is orange-blossom honey, which carries with it some of the fragrance of the flowers themselves. It is one of the lightest-colored of the tree honeys, a point in its favor so far as the market is concerned.

A hardy tree of the North, whose flowers are the source of a most excellently-flavored honey, is the linden or basswood. Its clustered little flowers are inconspicuously greenish but intensely sweet-scented, and while they are in bloom the bees simply go mad over them.

Many honey-tasters declare that the best-flavored of all honeys comes from the sourwood tree. This is a tree of rather limited distribution, being abundant only in parts of the Appalachian highlands, but where it does grow, and bees are given a chance at it, they will produce from its clusters of heather-like bloom a most unforgettable sweet.

Science News Letter, June 5, 1948

ASTRONOMY

Different Types of Light

Giant member of double-star in constellation of Auriga, emits most of its yellow light: smaller star responsible for large amount of total ultraviolet light.

► THE smaller member of a two-star team in the constellation of Auriga, the charioteer, has been found to contribute little to the yellow light emitted by the double star, but accounts for a large amount of its total ultraviolet light.

When the blue-type star of Zeta Aurigae is completely exposed, the percentage of ultraviolet light received from the double star is four times as great as during eclipse, reports Dr. Edison Pettit of Mount Wilson Observatory of the Carnegie Institution of Washington.

Although the percentage of yellow light sent earthward by the two stars is somewhat less when both stars are visible, the quantity of yellow light received is a little more than when the giant red star hides its smaller companion.

Zeta Aurigae is a fourth magnitude star, thus is visible with the naked eye in the base of that little triangle of stars near Capella.

The diameter of the giant red star, five and one-half times brighter than its blue companion, is 69 times as large as that of the smaller star and 200 times that of the sun, Dr. Z. Kopal of Harvard College Observatory has calculated.

During eclipse, the light from the smaller star is completely shut off for about 37 days. Three eclipses occur in eight years, one at the beginning of the year, one in August and one in May.

The withdrawal of light during

eclipse is much more noticeable when studied in some regions of the spectrum than in others. In visual light the variation is slight, being only 0.18 magnitude. In photographic blue light, the double star loses 0.68 magnitude at eclipse-time, Dr. Pettit reported to the Astronomical Society of the Pacific. But in ultraviolet, the light decreases two whole magnitudes when the smaller star is hidden.

A tenuous atmosphere surrounds the giant star. Like the corona around our sun, it extends about a diameter from the star's surface. Giant prominences, similar to the huge flame-like clouds of gas seen erupting from the surface of the sun, have been discovered on this star. The layer surrounding the star being semitransparent, the actual eclipse begins with a diminishing of light rather than as a sharp cutoff of brightness.

No diminution of the light of the blue star during the time it was passing behind the tenuous atmosphere of the giant red star had been detected in the past. During the eclipse last spring, however, the refrigerated photoelectric photometer that Dr. Pettit used showed that while the yellow light is not affected, the blue light of the blue star is diminished 0.07 magnitude and the ultraviolet light 0.12 magnitude. These quantities are too small to be readily measured by ordinary means.

Science News Letter, June 5, 1948

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BUTCH LEARNED THE HARD WAY—*Bureau of Labor Standards*, 16 p., illus., paper, free if ordered direct from Bureau of Labor Standards, U. S. Department of Labor, Washington 25, D. C. Safety rules enlivened by clever drawings.

CARTELS OR COMPETITION? The Economics of International Controls by Business and Government—George W. Stocking and Myron W. Watkins—*Twentieth Century Fund*, 516 p., \$4.00. Discussion of a problem having an important bearing on whether the United States can continue to maintain the system of free enterprise.

THE CHEMICAL CONSTITUTION OF NATURAL FATS—T. P. Hilditch—*Wiley*, 2d ed., 554 p., \$9.00. Including about 420 fats from plant species, about 80 from land animals and about 100 of aquatic origin.

COME TO THE ZOO—Ruth M. Tensen—*Reilly & Lee*, 26 p., illus., \$1.75. With the brief text planned to be easy reading for the beginner, this delightful book of photographs serves as an excellent introduction to the world of animals.

AN INTRODUCTION TO THE PHYSICS OF METALS AND ALLOYS—W. Boas—*Wiley*, 193 p., illus., \$3.50. Based on a series of lectures at the University of Melbourne.

IONOSPHERIC RESEARCH AT WATHEROO OBSERVATORY, WESTERN AUSTRALIA, JUNE, 1938-JUNE, 1946—L. V. Berkner and H. W. Wells—*Carnegie Institution of Washington*, 425 p., paper \$2.00, cloth \$2.50. Studies of the radio-reflecting layers of the upper atmosphere.

THE MAN IN THE STREET: The Impact of American Public Opinion on Foreign Policy—Thomas A. Bailey—*Macmillan*, 334 p., \$5.00. The author indicates that the American citizen has much more power than he may realize although many exercise their sovereignty in an ignorant way.

THE NEW INTERNATIONAL YEARBOOK: A Compendium of the World's Progress for the Year 1947—Henry E. Vizetelly, Ed.—*Funk & Wagnalls*, 683 p., illus., \$10.00. An alphabetically arranged chronicle which includes a physics section by the director of Science Service.

OCEANIC BIRDS OF SOUTH AMERICA: A Study of Species of the Related Coasts and Seas, Including the American Quadrant of Antarctica Based Upon the Brewster-Sanford Collection in the American Museum of Natural History—Robert Cushman Murphy—*Macmillan*, 1245 p., illus., 2 vols., \$17.50. New edition published by Macmillan of a book originally put out by the American Museum of Natural History. Beautifully illustrated.

PHOTOELASTICITY, VOLUME II—Max Mark Frocht—*Wiley*, 505 p., illus., \$10.00. In-

corporating new work done since the publication of Vol. I, including developments in 3-dimensional techniques of stress analysis.

PICTORIAL ASTRONOMY—Dinsmore Alter and Clarence H. Clemenshaw—*Griffith Observatory*, 288 p., illus., Fabrikoid \$3.00, Leatherette \$2.00. Suitable as high school or college text but pleasant reading and useful reference book for the layman.

WHAT IS PSYCHOANALYSIS?—Ernest Jones—*International Universities Press*, rev. ed., 126 p., \$2.00. Covering the history, content and applications.

THE REHABILITATION OF THE PATIENT: Social Casework in Medicine—Caroline H. Elledge—*Lippincott*, 112 p., \$2.50. How to help individuals like the boy who said, "I'm only 14 years old and I can't get along without my leg."

VOCATIONAL PLANNING: A Guidebook for Successful Careers—Frank S. Endicott—*International Textbook Co.*, 2d ed., 147 p., illus., \$1.60. By the director of placement at Northwestern University.

WAR, POLITICS, AND INSANITY—C. S. Bluemel—*World Press*, 121 p., \$2.00. A

discussion of the psychological qualities of political leadership and the disorders of personality with which aggressive leadership is commonly associated. The author is a practicing psychiatrist.

Science News Letter, June 5, 1948

ORNITHOLOGY

Hall of Bird Specimens Opened at N. Y. Museum

► BIRDS in the widest possible variety, ranging from two-inch hummingbirds of present-day tropical forests to ten-foot skeletons of the extinct moa of New Zealand, went on display at the American Museum of Natural History in New York with the formal dedication of the Leonard C. Sanford Hall of Biology of Birds.

The exhibits are arranged not merely with the idea of showing specimens of birds from all over the world, but to give some idea of how birds live and how they make their livings, how they get along with each other, and how they fit into their environments.

Science News Letter, June 5, 1948

What the Kinsey Report means to you

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Dr. Abraham Stone, President, American Association of Marriage Counselors
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Dr. Clyde Kluckhohn, Professor of Anthropology, Harvard University

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Mrs. Sidonie M. Gruenberg, Director, Child Study Association of America

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Dr. Joseph K. Folsom, Professor of Sociology, Vassar College

ARE KINSEY'S METHODS VALID?
Dr. Leo Crespi, Associate Professor of Psychology, Princeton University

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Dr. Robert P. Knight, Austen Riggs Foundation

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Dr. Robert M. Lindner, Consultant Psychologist, Maryland State Board of Correction

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Judge Morris Ploscowe, New York City Magistrates Courts

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Rev. Seward Hiltner, Director Pastoral Services, Federal Council of Churches

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Dr. Charles Wilber, Assistant Professor of Physiology, Fordham University

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Dr. Louis I. Newman, Rabbi, Temple Rodeph Shalom, New York City

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• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 417. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❁ **FRANKFURTER COOKER**, for use on the dining table, is a plastic holder for three "hot dogs" with a covering lid of the same material. Closing the lid automatically throws a switch which permits the household electric current to flow through the frankfurters, cooking them from the inside to the outside in about two minutes.

Science News Letter, June 5, 1948

❁ **FUEL INJECTION PUMP** for automotive diesel engines is a single-plunger type with a single delivery valve to do the work formerly done by four or six plungers and delivery valves, depending upon the number of cylinders to be served. The complete pump is less than half the size and weight of present multi-plunger types.

Science News Letter, June 5, 1948

❁ **ALUMINUM CANDLES** are actually aluminum tubes tapered at the top to make them look like wax candles. The candle itself is on the inside with its wick projecting above, and as it burns, a coil spring under it pushes it upward to remain with flame exposed.

Science News Letter, June 5, 1948

❁ **WINDOW WASHER**, shown in the picture, has a hollow plastic handle which, when filled, feeds water through tiny holes into a felt blade. The device loosens dirt for easy removal with a soft cloth. Little water is used, and it can not



drip onto surrounding areas. A vent in the handle cap keeps the water flowing during use.

Science News Letter, June 5, 1948

❁ **BRITISH RADIO**, with the release of one bolt, opens like the petals of a flower, making all components easily accessible for servicing and testing. It is in a plastic-molded cabinet, the performance of which is claimed to be equal to wood.

Science News Letter, June 5, 1948

❁ **COMBINATION HAND TOOL** for electricians cuts off, without damage

to threads, the ends of any of the four sizes of machine screws most used in electrical work, and it also cuts and strips electrical wire. It is a pocket-size tool of high-strength alloy steel, fitted with shock-proof plastic grip handles.

Science News Letter, June 5, 1948

❁ **VINYLLITE PLASTIC** bags are particularly suitable for shipping wet materials and also products of chemical companies where lint from ordinary bags might contaminate the contents. They are transparent, will withstand rough handling, and holes resulting from cutting can be easily and quickly repaired by heat-sealing.

Science News Letter, June 5, 1948

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Question Box

BIOCHEMISTRY

From what source may a new antibiotic be produced? p. 358.

CHEMISTRY

Why is the international distribution of isotopes urged? p. 364.

DENDROLOGY

What is the difference between the Metasequoia of China and the American Sequoias? p. 357.

ELECTRONICS

How can sound be transmitted by pulse modulation? p. 355.

Photographs: Cover, General Electric Co.; p. 355, Goodyear Tire and Rubber Co.; p. 357, Prof. Ralph W. Chaney; p. 359, U. of Nebraska; p. 363, Gulf Oil.

ELECTRONICS-PHYSICS

How does high-pitched sound detect invisible infra-red light? p. 358.

ENGINEERING

What are some of the applications of the new low temperature batteries? p. 365.

MEDICINE

How were partially paralyzed patients enabled to walk again? p. 356.

What is the new method for detecting brain tumors? p. 357.

PALEONTOLOGY

What is the difference between early bison and modern bison? p. 359.

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